

Ramaswami 2001-0324

IN THE CLAIMS:

1. (Currently Amended) A call set-up method, in an arrangement that includes a plurality of terminals that are connected to a network via a serial connection of at least one transmission medium comprising a plurality of communication channels, said channels being a shared overloadable resource, and where, in addition to at least one out-of-band signaling channel at least one of the communication channels is divided into a plurality of enhanced signaling channels, the improvement one or more out of band signaling channels between a first element that serves a plurality of terminals and a second element that is coupled to a communication network, as well as a plurality of communication channels between said first element and said second element, where each of said communication channels providing a given bandwidth, and one or more groups of enhanced signaling channels, where each of said groups is formed from one of said communication channels and containing a plurality of said enhanced signaling channels, comprising:

in response to one of said terminals requesting a call set-up, employing said enhanced signaling channels to communicate call set-up information; and

in response to receiving said call set-up information, executing a congestion control process that results in (a) setting up a call for said one of said terminals, when conditions on said communication channels permit, and (b) dropping an established call from one of said communication channels in order to create conditions that permit setting up said call by said step of setting up.

2. (Canceled) .

3. (Canceled) .

4. (Original) The method of claim 1 where said enhanced signaling channels carry at least some audible signals in said step of employing.

5. (Original) A method for providing telecommunication service, in an arrangement including a plurality of terminals that are coupled to a node, which node is

Ramaswami 2001-0324

coupled to apparatus via a multi-communication-channel transmission medium, comprising the steps of:

in response to an off-hook condition assumed by one of said terminals, it being a seeking terminal, detected by said node, passing off-hook information to said apparatus over a signaling channel that belongs to a plurality of enhanced signaling channels;

determining whether unoccupied capacity exists on communication channels between said apparatus and said seeking terminal that belong to said multi-communication-channel transmission medium;

when said step of determining concludes that unoccupied capacity exists, assigning one or more unoccupied communication channels to form a communication path between said seeking terminal and said apparatus, and proceeding with provision of said telecommunication service to said seeking terminal;

when said step of determining concludes that unoccupied capacity does not exist, undertaking a congestion control process to either drop an existing connection to free one or more communications channels that can form a communications path between said seeking terminal and said apparatus, or declines to provide said telecommunication service; and

when said step of determining frees said one or more communication channels that can form a communications path between said seeking terminal and said apparatus, employing said one or more communication channels to proceed with provision of said telecommunication service to said seeking terminal.

6. (Original) The method of claim 5 where, in said step of a assigning one or more unoccupied channels of said multi-communication-channel transmission medium and proceeding with provision of said telecommunication service, signaling between said seeking terminal and said apparatus that is associated with said provision flows through said signaling channel.

7. (Original) The method of claim 5 where said congestion control process provides a dial tone to said seeking terminal, receives dialed digits from said seeking

Ramaswami 2001-0324

terminal and reaches a conclusion as to whether to drop a call based on said received dialed digits.

8. (Original) The method of claim 7 where said dial tone is provided by said apparatus, via said signaling channel.

9. (Original) The method of claim 5, carried out in said apparatus.

10. (Original) The method of claim 5 where said congestion control process comprises:

a first step, of assessing whether identity of said seeking terminal suffices to reach a conclusion to drop a call,

when said assessing determines that said identity of said seeking terminal is insufficient, a second step of providing a dial tone to said seeking terminal, receiving dialed digits from said seeking terminal, and reaching a conclusion as to whether to drop a call based on said received dialed digits; and

when a conclusion is reached by said first step or said second step to drop a call, a third step of dropping an existing connection in accordance with a preselected process to free one or more channels that can form said communications path between said seeking terminal and said apparatus.

11. (Original) The method of claim 10 where signal communications in said second step are carried out over said signaling channel.

12. (Original) The method of claim 5 where said plurality of channels that are dedicated to signaling are derived from a preselected number of communication channels belonging to said multi-communication-channel transmission medium.

13. (Original) The method of claim 5 where said plurality of channels that are dedicated to signaling are derived from a preselected number of subdivided

Ramaswami 2001-0324

communication channels belonging to said multi-communication-channel transmission medium.

14. (Original) The method of claim 5 where number of signaling channels in said plurality of channels that are dedicated to signaling is variable.

15. (Original) The method of claim 14 where said number of signaling channels in said plurality of channels is a function of load.

16. (Original) A method for providing telecommunication service, in an arrangement including a plurality of terminals that are coupled to a node, which node is coupled to apparatus via a multi-communication-channel transmission medium, comprising the steps of:

(a) in response to an off-hook condition assumed by one of said terminals, it being a seeking terminal, determining whether unoccupied capacity exists on communication channels between said apparatus and said seeking terminal that belong to said multi-communication-channel transmission medium;

(b) when said step of determining concludes that unoccupied capacity exists, assigning unoccupied one or more channels of said multi-communication-channel transmission medium to form a communication path between said seeking terminal and said apparatus, and proceeding with provision of said telecommunication service to said seeking terminal, where signaling that is associated with said provision flows through a signaling channel that belongs to a plurality of channels that are dedicated to signaling;

(c) when said step of determining concludes that unoccupied capacity does not exist, undertaking a congestion control process to either drops an existing connection to free one or more channels that can form a communications path between said seeking terminal and said apparatus, or declines to provide said telecommunication service; and

(d) when said step of determining frees said one or more communication channels of said multi-communication-channel transmission medium that can form a communications path between said seeking terminal and said apparatus, employing said one or more communication channels to proceed with a process for providing of said

Ramaswami 2001-0324

telecommunication service to said seeking terminal, where signaling that is associated with said process for providing flows through a signaling channel.

17. (Original) The method of claim 16 where said signaling channel is in a path between said node and said apparatus.

18. (Original) The method of claim 16 where said signaling channel is in a path between said seeking terminal and said node.

19. (Original) The method of claim 16 where said signaling channel is in a path between said node and said apparatus and in a path between said seeking terminal and said node.

20. (Original) The method of claim 16, executed in said node.

21. (Original) The method of claim 16 where said proceeding with provision of said telecommunication service to said seeking terminal in step (b) comprises said node providing a dial tone to said seeking terminal and receiving dialed digits from said seeking terminal.

22. (Original) The method of claim 21 where said node generates said dial tone within said node.

23. (Original) The method of claim 22 where said dial tone provided to said node to said seeking apparatus is over said signaling channel.

24. (Original) The method of claim 21 where said node provides said dial tone to said seeking apparatus by transferring a dial tone received by said node from said apparatus.

Ramaswami 2001-0324

25. (Original) The method of claim 24 where said dial tone received by said node from said apparatus is received via said signaling channel.

26. (Original) The method of claim 24 where said dial tone received by said node from said apparatus is received via a portion of said signaling channel that exists in path between said node and said apparatus, and is provided to said seeking apparatus by said node via a portion of said signaling channel that exists in path between said node and said seeking terminal.

27. (Original) The method of claim 21 where dialed digits are received and stored in said node prior to said node

- (i) indicating to said apparatus of an off hook condition,
- (ii) receiving a dial tone from said apparatus, and
- (iii) providing to said apparatus the stored dialed digits.

28. (Original) The method of claim 27 where steps (i), (ii), and (iii) employ said signaling channel.

29. (Original) The method of claim 27 where steps (i), (ii), and (iii) employ said a portion of said signaling channel that is in path between said node and said apparatus.

30. (Original) The method of claim 27 where said signaling channel is in path between said seeking apparatus and said node, and steps (i), (ii), and (iii) employ a communication channel.

31. (Original) An arrangement comprising:
a plurality of terminals that are coupled to an HET terminal;
a central office switch; and
a path between said HET terminal and said central office that comprises a first plurality of communication channels, and a second plurality of dedicated signaling channels.

Ramaswami 2001-0324

32. (Original) The arrangement of claim 31 where said second plurality is deriving from subdividing each of a selected number of said communication channels into two or more signaling channels.

33. (Original) The arrangement of claim 32 where said selected number is variable.

34. (Original) An arrangement comprising:

a first element serving a plurality of terminals;

a second element coupled to a communication network;

one or more out-of-band signaling channels between said first element and said second element;

a plurality of communication channels between said first element and said second element, each of said communication channels providing a given bandwidth; and

one or more groups of enhanced signaling channels, where each of said groups is formed from one of said communication channels and containing a plurality of said enhanced signaling channels used for call set-ups between said first element and said second element.

35. (Original) The arrangement of claim 34 where said first element is a concentrating element.

36. (Original) The arrangement of claim 35 where said plurality of terminals is greater in number than number of said communication channels.

37. (Original) The arrangement of claim 35 where said out-of-band signaling channels, said plurality of communication channels, and said groups of enhanced signaling channels share a single physical transmission medium.

38. (Original) The arrangement of claim 35 where said out-of-band signaling channels, said plurality of communication channels, and said groups of enhanced

Ramaswami 2001-0324

signaling channels are time-division multiplexed onto a single physical transmission medium.